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# TYPHO-MALARIAL FEVER:

# IS IT A SPECIAL TYPE OF FEVER?

BEING

Remarks Introductory to the Discussion of the Question

IN THE

## Section of Medicine, International Medical Congress.

BY

J. J. WOODWARD,

*Assistant Surgeon, U. S. A.,*

IN CHARGE OF THE REPRESENTATION OF THE MEDICAL DEPARTMENT, U. S. A.

Philadelphia, 1876.

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# Typho-Malarial Fever: Is it a Special Type of Fever?

Since the earliest times Pestilence has followed in the footsteps of War. It has been the consequence of Ignorance as much as of Necessity. Its causes are to be sought, not merely in fatigues, exposures, and privations necessarily incurred during the performance of heroic deeds; not merely in the morbific influences of strange climates; not merely in the miseries of besieged places; they are equally to be sought in the thousand preventable abnormal conditions to which armies are exposed when huddled together in ill-selected, over-crowded, and filthy camps, fed by ignorance or cupidity on scanty, improper, ill-cooked food, drinking water contaminated by human excretions, and breathing air poisoned by human effluvia. Hence arises a brood of camp diseases more destructive than the improved small-arms or rifled cannon of any foe; which, on memorable occasions in times past, have annihilated whole armies, and yet more frequently decided the fate of campaigns in spite of the military genius of generals or the heroism of their followers.

The humane spirit of modern civilization revolted at horrors which modern science has shown to be to a great extent preventable, has made of late years earnest efforts at prevention, and the intelligence of modern administration has perceived that the success of such efforts is an indispensable condition to success in war. It is this double motive that has called into existence the Medical Staff, which has become of late years an essential component part of the army of every civilized nation. The work to be done cannot be performed by a band of hired barber-surgeons employed to bind up rudely the wounds received in battle; it cannot be performed by the voluntary assistance of the crowd of educated civil physicians who may be led by motives of humanity to the scene of suffering, after the mischief is done and pestilence has actually broken out; for its efficient performance it requires the existence of a trained Medical Staff.

To possess the desired efficiency such a staff must be a component part of the army in time of peace. It must enjoy such rank and pay in its higher grades, and offer to its lower grades such prospects of rea-

sonably rapid promotion as to secure the life-long services of the ablest medical men. These must devote themselves in times of peace to the study of the sanitary conditions which affect the health of armies, and war must find them ready to point out with authority the precautions which cannot be neglected without peril. The demands of philanthropy, the impulses of humanity, are best fulfilled by such a staff when it best discharges its military duty, which is to see to it that of a given number of soldiers on the rolls, the largest possible number shall always be ready for duty.

This proper duty of the Medical Staff is as much a military duty as that of the artillery or the infantry. It is the business of these to maim and destroy till the strength of the enemy is so diminished that he can no longer resist; it is the business of those to aid in keeping the fighting ranks full until their work is done. For the efficient discharge of this military duty the medical staff requires military rank as much as any other branch of the army service. It requires it, not merely because it is otherwise impossible to secure the continuous service of an efficient personnel, but because, without military rank, no personnel, whatever its qualifications, can be really efficient. It requires rank, because it requires authority. If its wise counsels can be thwarted at every step by the obstinacy of ignorance, it becomes a mere witness of evils which it is impotent to prevent.

This is not the time or place to discuss the question as to whether the conditions just indicated as necessary to secure the most efficient medical staff possible have yet been completely fulfilled in any army. I must leave that question to the thoughtful consideration of my hearers of all countries. It is enough for my present purposes to point out that coincidently with the elevation of the medical staff in modern times the camp diseases of modern wars have notably diminished in malignancy. We no longer hear of armies destroyed by pestilence within the first few weeks or months after taking the field. The old bubo-plague and spotted typhus no longer figure in the history of wars between civilized nations.

I admit that much remains to be done by Preventive Military Medicine. I admit that much remains to be learned with regard to the causes of disease. But this is no reason why armies should not enjoy to the uttermost the knowledge we already possess. And it is after all but a partial application of this knowledge which has brought about the amelioration to which I have just referred. I think it is safe to affirm that no army ever yet took the field, even in the most modern times, that did not campaign in daily violation of well-established hygienic laws. And hence it will be found that if in any modern war the mortal-

ity from disease has been very small, it has been because the struggle has been very brief. We shall deceive ourselves if we overlook the element of time in the production of the diseases of modern armies. An army may very well escape with trifling mortality from an exposure of a few weeks or months to influences which would have proved fearfully destructive if continued for a year or longer.

This was well illustrated by the experience of the Armies of the United States during the civil war by which this country was recently convulsed. Notwithstanding the want of discipline among the newly-levied troops; notwithstanding the lack of experience in military medicine on the part of the newly-enrolled medical officers; notwithstanding all the faults of administration and the necessity of reform, of which so much has been said in certain quarters, the mortality from disease did not exceed 2.2 deaths per 1,000 of strength monthly, during the first six months of the struggle*—a death rate which, if it had continued, would have represented an annual loss from disease of 26.4 per 1,000 of strength. But in point of fact a rapid increase in the mortality took place after the first of November, 1861. The deaths from disease during the year ending June 30, 1862, were at the rate of 49.3 per 1,000 of strength, and, in spite of increased discipline and increased experience, the reorganization of the Medical Staff, and other reforms, rose to 63.2 per 1,000 of strength during the year ending June 30, 1863. During the year ending June 30, 1864, the improved discipline and sanitary management of the white troops were at length accompanied by a diminished mortality, and the death-rate from disease fell to 48.2 per 1,000 of strength, or very nearly what it was during the first fiscal year of the war. Subsequently, however, it rose again, in spite of every effort, and was 56.5 per 1,000 of strength during the year ending June 30, 1865. These figures, it must be remembered, refer only to the white troops, who constituted the bulk of our forces. They include both the regular army and the volunteer troops. And I may remark that I have shown in the introduction to the first volume of the Medical History of the War,† after an analysis of the records of the Surgeon General's office, and a careful comparison with the records of the Adjutant General and the Quartermaster General, that the average annual mortality from disease among the white volunteers, during the four years of the struggle, must be fixed at 55 per 1,000 of mean strength, while it was only 32 per 1,000 of strength for the small regular army during the same period.

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*These figures and those in the following paragraphs are deduced from the Statistical Tables of the first Medical volume of the *Medical and Surgical History of the War of the Rebellion*, (1861–'5.) Washington, Government Printing Office, 1870.

† *Op. cit.*, Introduction, p. XLI.

But what shall I say of the mortality among the colored troops? The statistical tables in the first volume of the Medical History show it to have been 211 per 1000 of mean strength during the year ending June 30, 1864, and 139.8 during the year ending June 30, 1865. Even if we extend the view to cover the whole period from the day the first volunteer colored regiment was mustered into service to the day the last was mustered out, a period of five years and four months, and distribute the mortality over the whole term, it will be found, as I have shown in the Introduction to the first volume of the Medical History,* that it represents an average annual mortality from disease of 133 per 1000 of mean strength—a proportion which it is impossible to consider without emotion.

It is only just to express my conviction that a large part of this excessive mortality was due to circumstances from which the colored men suffered before they were enlisted, rather than to mismanagement or maltreatment afterwards. It must be remembered that a large part of these colored soldiers were fugitive slaves. They fled into our lines literally naked and starving. The diseases which destroyed them were to a great extent engendered by the miseries they had suffered before they found a refuge under our flag.

In all—embracing in the count all arms and all colors, officers and men—the total mortality of the armies of the United States from disease during the war, (including the deaths during the year following, in which a large part of the mortality was from diseases contracted during the struggle,) may be fixed at a little over 200,000 men, while battle and wounds destroyed rather more than 100,000.† This estimate of 200,000 men dead of disease embraces, it must be remembered, not only about 30,000 of the colored soldiers, upon whose mortality I have commented, but a nearly equal number of white soldiers, who died while prisoners of war in the hands of the enemy, under circumstances upon which I refrain from comment at this time, but for which the Medical Administration of the United States army can assuredly in nowise be held responsible.

These circumstances no doubt increased the mortality of our armies

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* *Op cit.*, Introduction, p. XL.

† In the Introduction to the first Medical volume of the Medical and Surgical History of the War, I have fully discussed the various official records, and arrived (see p. XXXVIII) at the following results, which are probably very near the truth:

| | |
|---|---|
| Deaths from battle, wounds, and other violence | 93,969 |
| Deaths from disease | 186,216 |
| Deaths, the causes of which are not recorded | 24,184 |
| | 304,369 |

On the reasonable supposition that those deaths in which the causes are not recorded were distributed between wounds and disease in the same proportion as those whose causes are recorded, we shall arrive at the results expressed in the text.

greatly beyond what it would otherwise have been. On the other hand, it must not be forgotten that discharges from the service for disability took place with a freedom—perhaps in strict justice I ought to say, with a recklessness—never before exhibited in any army. The total number of soldiers thus discharged may be estimated as not far short of three hundred thousand.* No doubt very many of these men only went home to die. No doubt, also, many thousands of them, especially those suffering with lame backs and general debility, rheumatic pains, and cardiac palpitations, needed only a short sojourn in a northern climate, with a generous diet, to have fitted them again for the field. I cannot dwell here on this shameful story. It is one of the scandals of the war. I have never been able to collect data to justify even an approximate estimate of the proportion of these men who died. I believe it to have been comparatively small. Removed from the theatre of war, returned to the healthier circumstances of their homes, I doubt not that a large proportion of these men recovered their health, and that thousands of them, induced by the large bounties which were offered for recruits, found their way again into the ranks.

Certainly the statistics I have cited afford food for earnest thought. But if their study is to be profitable, it must be undertaken with a careful consideration of all the circumstances. Above all, when these figures are compared with the results of other wars, the element of time must be taken into account, or the gravest misunderstandings will arise. A striking illustration of this possibility has been brought to my notice.

In an oration delivered on the 2d of August, 1874, on the anniversary of the Military Medical School of Berlin,† Professor Rudolph Virchow, one of the ablest medical thinkers in Europe, alluded to this enormous mortality from disease during our war, and contrasted it with the comparatively small losses of the German army during the late war with France. After reciting the American figures, and, I may add, after speaking of the publications of the Surgeon General's office in language so complimentary that, as one of the officers concerned in their preparation, my modesty will not allow me to repeat it, the distinguished orator continued as follows: "The German army had, during the last French war, out of a strength of 913,967 men, a total loss of 44,980. Of these, 17,572 fell before the enemy, 10,710 died later of their wounds, 12,253 fell a sacrifice to disease and pestilence; certainly a very favorable proportion. But we had before us the experiences of two recent

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* See Introduction to the first Medical volume, just cited, p. XLII.

† *Die Fortschritte der Kriegsheilkunde, besonders im Gebiete der Infectionskrankheiten.* Rede gehalten zur Feier des Stiftungstages der militar-ärztlichen Bildungs-Anstalten, am 2. August, 1874, von R. Virchow. Berlin, verlag von A. Hirschwald, 1874.

wars, which had been well discussed and taken advantage of, both scientifically and administratively. We possessed the inestimable experience of the Americans, and, finally, we had German science."*

Truly, I will not yield even to Virchow himself in my appreciation of German science. I know well the debt of gratitude which modern medicine owes to German investigation. For myself, I have drawn much of the knowledge I value most from German sources. I admire German science for its industry, which is without parallel: for its originality, which has already pushed discovery so far; but most of all, for the truly catholic spirit which knows no nationality, and for the manly independence, which never hesitates to weigh authority by a comparison with the actual facts.

Something of this spirit I have tried to catch, and I will not therefore allow myself to be misled as to the matter under discussion, even by the authority of Virchow. I cannot avoid interpreting the facts otherwise than he has done, and I feel that I am but performing a necessary duty when, standing here before you to-day, I declare it to be my opinion that not even German science would have sufficed to save the German army from a greatly increased percentage of mortality if the war had lasted a few years instead of a few months.

The figures given by Virchow are from the official report of Dr. Engel.† They represent a period of seven months. They must not be compared with the losses of our whole civil war, but with the losses of the first seven months. Let us make the comparison. Virchow's figures represent a mortality of 13.4 + per 1000 of strength for seven months, or 1.9+ per 1000 monthly. Now, I have already shown you that the mortality from disease in our armies during the first six months of the war averaged 2.2 per 1000 monthly. During the following month, viz., November, 1861, the mortality increased very greatly, so that, indeed, almost as many died during that month as during the whole six months preceding. Including these deaths, I find, on a discussion of the official data, that during the first seven months of the civil war, viz., from May 1 to November 30, 1861, the mortality from disease was at the rate of 18.8 per 1000 of strength, or 2.7 per 1000 monthly.‡ You see that the

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* *Op. cit.*, S 7.

† *Zeitschrift des Königlich Preussischen Statistischen Bureaus.* Redegirt von dessen Director Dr. Ernst Engel. Zwölfter Jahrgang, 1872. Berlin, 1872, S, 293.

‡ These ratios are deduced from the Statistical Tables in the first Medical volume of the Medical and Surgical History quoted above. I may add here, that the total number of deaths from disease from the commencement of the war to November, 1861, recorded on the alphabetical registers of the Surgeon General's Office, is 3,226. There are also 160 deaths recorded during the same time, the causes of which are not specified. If we suppose all of these to have been deaths from disease, the number will be 3,366. Of this number 1,457 died during the month of November, viz: 1,413 of disease, and 44 of causes not specified. The absolute number is but a little more than one-fourth of the German figures; but the average strength of the troops in service during the time referred to was also about a fourth of the

mortality of our army from disease, during equal times, was really but about one-third greater than that of the German army in the French war; whereas, as Virchow presents the subject, it is made to appear more than fifteen times greater.

Now, I am perfectly willing to admit that a part of the actual difference in favor of the German army was really due to better discipline and a wiser application of Preventive Medicine. But I do not believe that this is the only reason for the difference. The raw levies of the Northern States were sent at the very first to the South, and campaigned or lay in camp during the time in question in the miasmatic valleys of the Mississippi, the Ohio, and the Potomac, while the German army did its work on the comparatively salubrious plains of France. What would have happened had the scene been exchanged? How much of the difference was really due to the wisdom of man, how much to a more favorable climate, and the absence of the intense malarial poison to which all were exposed who bore our arms?

This malarial influence, and the pathological processes to which it gives rise, demand the most careful study of those who would endeavor to comprehend the problem of the health of armies in America. It is not merely manifested by the frequency of ordinary ague, of which very nearly a million cases* were officially reported in our armies during the war; it

German army, so that the ratios are as stated in the text. The comparatively small mortality at the commencement of our civil war is strikingly illustrated by the Medical History of the three-months' volunteers. It will be remembered that at the commencement of the struggle President Lincoln called out 75,000 men to serve for three months. This call was issued April 15, 1861. According to the records of the Adjutant General's Office the actual number of men who were mustered into service on this call was 91,816. Through the kindness of Assistant Adjutant General T. M. Vincent, I have ascertained from the death and disability records of the Adjutant General's Office that the actual mortality of these troops during their three-months' service was as follows:

| | |
|---|---|
| Deaths from battle, wounds, and other violence | 221 |
| " from disease | 151 |
| " from causes not recorded | 231 |
| Total | 603 |

If all the deaths of which the causes were not recorded were from disease, the total number of deaths from disease would be 382, or 4.2 per 1000 of strength for the three months. This would correspond to a mortality of 1.4 per 1000 monthly, or less than three-fourths of the monthly rate which I have shown in the text for the first six months of the war.

*The number of cases and deaths reported as due to Ague was as follows:

| | White Troops. | | Colored Troops. | |
|---|---|---|---|---|
| | Cases. | Deaths. | Cases. | Deaths. |
| Quotidian Intermittent Fever | 447,258 | 452 | 63,992 | 58 |
| Tertian Intermittent Fever | 375,170 | 381 | 51,045 | 54 |
| Quartan Intermittent Fever | 41,223 | 84 | 3,923 | 15 |
| Congestive Intermittent Fever | 13,673 | 3,370 | 2,536 | 794 |
| Total | 877,324 | 4,287 | 121,496 | 921 |

The grand total for both white and colored troops is 998,820 cases and 5,208 deaths. See the first volume the Medical History, cited above.

colors and complicates other diseases to an extent which can hardly be credited by those who have not been eye-witnesses to its effects. Especially does it demand the consideration of those who may attempt the study of the fatal continued fevers which have been, and will be, the scourge of the camps of every army that operates in the valleys of the Mississippi and its tributaries, or of the rivers that flow into the Gulf of Mexico, and into the Atlantic ocean south of the fortieth parallel.

These camp fevers occupy a conspicuous place among the diseases which produced the mortality of our armies during the civil war. They caused more than one-fourth of all the deaths from disease. In fatality they proved second only to diarrhœa and dysentery. I suppose it is safe to estimate that diarrhœa and dysentery produced about 60,000 deaths in the armies of the United States during the civil war, and camp fevers rather more than 50,000.* A right comprehension of these two groups of diseases must therefore be regarded as the most important task of Military Medicine in America.

It is my purpose in the present discourse to discuss certain points connected with the pathology of these camp fevers, and especially the complication of the typhous process by the malarial influences to which I have just referred.

Already in the fall and early winter of 1861 reports began to come in from various quarters that a new form of fever was prevailing in our camps. The great majority of our army surgeons at that time were fresh from civil life. Many of them had been engaged in extensive private practice. Almost all of them were well acquainted with ordinary typhoid fever (enteric fever, typhus abdominalis) as it annually prevails in the Northern States, and it was precisely these men who first called attention to the fact that the fevers they were now called upon to com-

* 44,558 deaths from diarrhœa and dysentery were reported during the war, out of 156,885 deaths from disease, the causes of which were specified in the reports. If we suppose these diseases to have caused the same proportion of those deaths from diseases the causes of which are not specified in the reports, we shall obtain the estimate of the text. The cases and deaths of the several forms of camp fevers reported to the Surgeon General's Office were as follows:

| | White Troops. | | Colored Troops. | |
|---|---|---|---|---|
| | Cases. | Deaths. | Cases. | Deaths. |
| Typhus Fever | 2,501 | 850 | 123 | 108 |
| Typhoid Fever | 75,368 | 27,056 | 4,094 | 2,280 |
| Common Continued Fever | 11,898 | 147 | ..... | ..... |
| Typho-malarial Fever | 49,871 | 4,059 | 7,529 | 1,301 |
| Remittent Fever | 286,490 | 3,853 | 30,645 | 1,002 |
| Total | 426,128 | 35,965 | 42,391 | 4,691 |

This gives a total of 40,656 deaths from these fevers out of 156,885 deaths from disease, the causes of which are specified in the reports. On the supposition just mentioned we obtain the estimate in the text.

bat differed in many important particulars from those to which they were accustomed at home.

This circumstance was noticed in both the Western and the Eastern armies; but, so far as I have been able to ascertain, official attention was first directed to it in the Army of the Potomac, then encamped just beyond the banks of the river in front of Washington. By an order from the Adjutant General's office, dated December 6, 1861, a Board of Medical Officers was convened for the purpose of visiting the camps of the Army of the Potomac, and inquiring into the nature of the prevailing fever, especially endeavoring to ascertain—to use the language of the order appointing the Board—"whether it is to be considered an intermittent or bilious remittent fever in its inception, assuming in its course a typhoidal type, or a typhoid fever primarily." This Board consisted of Surgeon A. N. McLaren, U. S. A.; Brigade Surgeon G. H. Lyman, U. S. Volunteers, and Assistant Surgeon M. J. Asch, U. S. Army. It convened December 16th, at the quarters of Brigade Surgeon Lyman, who was chief medical officer of the division commanded by General Fitz John Porter; and during its subsequent labors examined the hospitals of this and other divisions, and collected a great deal of valuable information, in writing, by means of written questions addressed to the brigade and regimental medical officers of parts of the army which its members were unable conveniently to visit. As might have been expected, some diversity of opinion was expressed in the replies received. But in their general tenor the great majority of these replies confirmed the opinion formed by the members of the Board on the basis of their own personal observations. This opinion was, that while a certain number of cases of ordinary typhoid fever existed in the army, the large majority of the febrile cases were "bilious-remittent fevers, which, not having been controlled in their primary stage, have assumed that adynamic type which is present in enteric fever."

In the following spring, after the Army of the Potomac commenced its Peninsular campaign, this mixed form of fever increased in frequency. It assumed formidable proportions during the siege of Yorktown, and reached its greatest intensity while the army lay encamped on the swampy borders of the Chickahominy. The hospitals of Washington and Alexandria, of Baltimore, Philadelphia, New York, and other Northern cities, were crowded to overflowing with the sick. Among the attending physicians were some of the best instructed medical men of the Northern States. They have shown that they recognized that they had to deal with an unusual pathological complex, by perpetuating the name of Chickahominy fever, which appears so often in their reports.

It was under these circumstances that I was ordered, early in the

summer of 1862, to serve on a Board of Medical Officers, who were directed to revise the form of sick report in use in the army. I was fresh from the Army of the Potomac, which I had accompanied from its camps before Washington, where I had spent the winter with it. I had lain in camp at Yorktown, and followed the army up the Peninsula. I had formed the opinion that the prevailing fevers of the Army of the Potomac were hybrid forms, resulting from the combined influence of malarial poisoning and of the causes of typhoid fever. I believed that individual cases received their characters in accordance as the one or the other of these influences preponderated in the individual, and that very often the picture was still further complicated by the coexistence of a scorbutic taint. Full of these opinions, I proposed to the Board, as I had previously suggested to the Surgeon General, to designate the complex condition in question by the name typho-malarial fever, and I induced the Board to add this term to the list of diseases printed on the blank form for the monthly sick report. I often regret that I did not also urge upon the Board the preparation of a circular letter to accompany the new sick report, explaining why this term had been adopted, and calling for special reports with regard to the cases which it was intended to designate. As it was, the term went upon the sick report without any explanation or a word of comment. But even under these circumstances, 23,346 cases were reported as typho-malarial fever during the following year, showing how widely the opinions I had formed were shared by the medical officers of the army.

In September, 1863, I published in Circular, No. 15, of the Surgeon General's Office,* a short statement with regard to the sickness and mortality of the army during the first year of the war, in which I stated the meaning I designed to attach to the term typho-malarial fever, and in November of the same year completed the publication of my Outlines of the Chief Camp Diseases of the United States Armies,† in which I presented my views at some length. I also gave a short account of the subject in Circular No. 6, Surgeon General's Office, 1865.‡ And now, after a careful study of all the pathological and documentary material

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* *Circular No. 15, Surgeon General's Office*, Washington, D. C., September 8, 1863. Sickness and Mortality of the Army during the First Year of the War. The language used in this preliminary report was as follows: "Moreover, while a certain amount of uncomplicated enteric and remittent fever certainly did occur, especially at the commencement of the war, the vast majority of the camp fevers of the army were of a mixed character, exhibiting undoubted enteric phenomena, variously combined with the periodicity and other peculiarities of malarial disease, and still further modified by the tendency to incipient scurvy, which is the ordinary concomitant of camp diet. To indicate this mixed nature, the term typho-malarial fever, which I had the honor to suggest to the Department in June, 1862, appears appropriate, and, at the present time, is coming into very general use."

† J. J. Woodward. *Outlines of the Chief Camp diseases of the United States Armies, as observed during the present war.* Philadelphia: J. B. Lippincott & Co., 1863. 8vo. pp. 364.

‡ *Circular No. 6, Surgeon General's Office*, Washington, November 1, 1865, p. 109 *et seq.*

accumulated during the war, I still hold substantially to the same views, and hope in the second volume of the Medical History of the War to present the facts upon which my opinion is based in such a manner as to command universal assent. In so doing, I shall, of course, present many additional matters of detail not contained in any of my former publications; and also, I may frankly say, I shall correct some errors of detail, particularly with regard to the pathological anatomy of the intestines in these fevers, into which I fell during my earlier studies, and which were incorporated in the account presented in my book on Camp Diseases.

In the same connection I hope to present historical proof of a proposition, which I do not hesitate even now to announce to you, that such hybrids between malarial fever and typhus, of one form or another, are no new thing in the history of armies. They were not first begotten on American soil. In fact, in every great army that ever yet campaigned for any length of time in a malarial region the prevalent form of fever has been a hybrid between malarial fever and some form of typhus. By a malarial region I mean simply a region in which ague and remittent fevers are the common endemic diseases. The causes of these fevers act always with peculiar intensity upon strangers; and an invading army is therefore peculiarly prone to suffer from them. At the same time the uncleanliness and overcrowding of camps favor the spread of some form of typhus, whether originating *de novo* or introduced from without by contagion. In some cases it has been spotted typhus which has made its appearance; in others it has been abdominal typhus, (typhoid fever;) and as the typhus poison has been of one or the other variety, and as the malarial influence has been more or less intense, the complex result has varied—at times the malarial phenomena, at times the typhous phenomena being the more prominent. The morbid conditions resulting from these twofold causes have usually also been still further modified by the existence of actual scurvy, or at least of a scorbutic taint, the result of an improper and often scanty supply of food.

It would be impossible, in the time allotted to me, to re-examine to any great extent the history of armies from this point of view. I can only bring to your notice a few striking illustrations. First, let me recall the pestilential fever which destroyed the French General Lautrec and the army of thirty thousand men with which he besieged Naples, in 1528. Hecker* has analyzed the chronicles of the time with his usual eloquence, and has arrived at the conclusion that it was simply petechial typhus which raged in the French camp. After an examination of the

* J. F. C Hecker. *The Epidemics of the Middle Ages.* Transl. of Sydenham Soc., London, 1844, 212, *et seq.*

authorities he cites, I cannot agree with this conclusion. The siege began May 1st. Almost the first act of the French General was to cut the aqueducts which supplied the city with water. By this rash act the plains on which he was encamped, intensely malarial at the best, were converted into a vast series of bogs and stagnant pools, from which the heat of the sun raised clouds of vapor, which hung around his camp like a pall. I must believe that Jovius* was right in attributing the destruction of the French army chiefly to this act of madness. No contemporaneous physician has described the pestilence that followed, but the chroniclers of the siege have recorded symptoms which are incompatible with the theory of Hecker. Jovius tells us that many of the patients were affected with swellings of the belly and legs. They became so pale and death-like in their complexions that their friends were hardly able to recognize them. Scarcely able to crawl, and without attendants to nurse them, they often died in their tents of hunger and thirst. Sandoval† describes the same death-like faces, and applies to them the epithet *amarillos* (yellow.) These are not the symptoms of spotted typhus, but of intense malarial poisoning. We .saw just such cadaverous yellow faces, with swelled legs and bloated bellies, crawling about in the camps at Young's Point on the Mississippi, and at other swamp-beset localities, during our own war.

I agree, however, with Hecker, to whose work I must refer you for particulars, that spotted typhus was no doubt also present in the camp; and I suppose it complicated the acute fevers very much, as it did later in the same century in the Austrian armies in Hungary. Moreover, Guicciardini‡ relates that after Lautrec first fell sick, during the month of July, things fell into confusion, the enemy cut off the convoys of provisions, and some of the soldiers actually died of starvation in consequence. These circumstances, I doubt not, also played their part in destroying the French Army. By the second of August there were but four thousand men fit for duty. Lautrec died August 15th, and, the mortality still continuing, his successor thought only of flight. This he attempted August 29th, but was pursued, and capitulated at Averse a few days later. Crowded into the stables of la Madeleine, the pestilence continued its ravages among the prisoners, and when, a little later, they were released by the conqueror, but a handful remained to find their way back to France.

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* Jovii (Pauli, *Novocomensis, Episcopi Nucerini*) *Historiarum sui Temporis.* Tome II, Florence, 1550–2, Lib. XXVI. I have not obtained access to the original, but find in the Congressional Library a German translation, printed at Frankfort, 1570.

† Sandoval. *Historia de la vida y hechos del Emperador Carlos V.* Pamplona, 1614–18. Part II, Lib. XVII, § XI, p. 12 *et seq.*

‡ Guicciardini. *Della Istoria d'Italia.* Lib. XX, Venice, 1738. I have used the English translation of A. P. Goddard, 3d Edit., London, 1763.

Next let me ask your attention to the story of the celebrated Hungarian fever, which for at least three centuries played so formidable a part in the campaigns undertaken by the House of Austria against the Turks. The valleys of the Danube and its tributaries are still the home of agues, remittent and continued malarial fevers, big spleens, and malarial cachexias. Lying further to the north than our own Mississippi valley, the climate is nevertheless such that the marshy borders of the streams and pools give rise to a malaria scarcely less intense than that with which we are familiar in the lower Mississippi. I may refer you to the papers of Müller, Wenmaring, and Lántz* for graphic descriptions of the characteristics of the country and of its prevailing diseases in our own day.

Now, in every considerable campaign against the Turks, in which the armies of the German Emperors invaded the Hungarian plains, from the beginning of the sixteenth century to the end of the eighteenth, a form of fever prevailed among the troops so unlike the ordinary European fevers that it has always been known as the Hungarian fever, and so fatal as to occasion the proverb that "Hungary is the grave of the Germans." This Hungarian fever has exercised some of the best medical minds of the last three centuries. It is now generally admitted to have been a hybrid between the endemic remittent fevers of the Hungarian soil and spotted typhus. The attention of civilized Europe was first directed to it when, after the luckless Hungarian campaign of Maximilian II, in 1566, his pest-stricken soldiers returned to their homes. They scattered the contagion of spotted typhus throughout Germany on their way. The disease bred by that contagion was also called the Hungarian fever, but it was simply spotted typhus, and the student of the voluminous older literature of the Hungarian fever finds no little confusion growing out of this circumstance, and no little difference between the descriptions of such eye-witnesses as Thomas Jordan and Tobias Cober, who described the Hungarian fever as they saw it on Hungarian soil, and the descriptions of those who merely observed the spread of spotted typhus in the German towns, and gave it the name of the Hungarian fever because the contagion had been spread by soldiers returning from Hungary.

The army of Maximilian, however, was not the first German army

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* Jos. Müller. *Die k. k. Militaergraenze, mit besonderer Berucksichtigung der vereinigten Carlstadter, Banal und Warasdiner Graenze.* Med. Jahrb. des k. k. oest. Staates. Bd 35, (1843,) S. 89, 231, 361. Bd. 36, (1843,) S. 110, 235, 338. F. Lantz. *Phys. Med. Beschreibung der Barangaer Gespannschaft in Ungarn.* (Same Journal.) Bd. 55, (1846,) S. 98, 231, 361. Bd. 56, (1846,) S. 99, 221, 349. B. Wenmaring. *Ueber die Sumpfwechselfieber.* (Same Journal.) Bd. 57, (1846,) S. 11, 129. Consult, also, J. M. Minderer. *Das Halbdreitagige Fieber,* (Hemitritæus,) *in den Sudlichen Provinzen des Russischen Reichs.* Hufeland's Journal, Bd. 28, st. 2, (1809,) S. 1. Müller, cited above, speaks of this fever as the *Hemitritæus Daciæ.* Op. cit., Bd. 36, S. 343.

which had suffered from the Hungarian fever. In 1542 a pestilential fever broke out at the camp before Ofen, in the Imperial German army which Margraf Joachim von Brandenburg had led against the Turks. It became still more fatal during the disastrous retreat, and according to Hæser* destroyed 30,000 men. Johannes Langius,† who accompanied the Count Palatine, Frederick II, in this campaign, as well as in the campaign of 1526,‡ has left an epistle, in which he describes this fever in such a manner as to leave no reasonable doubt of its identity. He tells us, also, that the camp surgeons, whose ignorance he pictures with bitter sarcasm, gave the disease the name of Bhreüne (Bräune) on account of the condition of the tongue, which they supposed to be the most essential symptom. According to Hæser,§ the Chronicler Wintzenberger gave the same epidemic the name, "pestartige Braüne." These names long continued in use among the designations by which the Hungarian fever was known to the vulgar.

The epidemic of 1566 is famous both on account of the manner in which typhus was spread through Europe by the disbanded soldiers, and on account of the classical description of the Hungarian fever by Thomas Jordan,‖ who accompanied the army of Maximilian as his chief medical officer. The spring had been exceedingly wet, and the great Hungarian streams had overflowed their banks; the summer was unusually hot and dry; the German army was scantily supplied with food. When the fever first appeared the army was encamped at Komorn, at the point of junction of the Waag and the Danube—a marshy, intensely malarial plain. It became still more destructive in the camp at Raab, where the Raab and Rabnitz empty into the Danube. Such was the devastation caused by it that Maximilian, though his force when he went into camp at Raab was about 80,000 men, did not venture to take the offensive, and saw the gallant little garrison at Zigeth captured by the Turks after more than twenty vain assaults, without daring to strike a blow in their behalf. In the early autumn he ignominiously retreated with the remains of his army. After the retreat the pestilence was especially destructive at Vienna. The hospitals could not accommodate all the sick, and the dead and dying were scattered through the streets. Throughout all this devastation it was the German troops that suffered; the native Hungarians almost entirely escaped.

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* Hæser. *Geschichte der epidemischen Krankheiten.* 2te Aufl. Jena, 1865, Bd. II, S. 340.

† D. Johannes Langius. *Med. Epist.* Basel, 1554. Epist. 4, (p. 17.) *In Cura Causonis Chirurgicorum temeritas.*

‡ See Hecker. Art. *Hungarica febris.* In the Encycl. Woerterbuch der Med. Wiss. Berlin, 1838, Bd. XVII, S. 164; with which compare the Dissertation by G. Agats. *De Morb. Hungarico.* Berlin, 1740.

§ *Op. cit.*, p. 341.

‖ Thomæ Jordani. *Pestis Phenomena.* Franckfort, 1576. Cap. XIX, (p. 219.) *De Lue Pannonia.*

The Hungarian fever broke out anew during the siege of Papa, in the year 1597. The Italian allies suffered most. According to Hæser, of more than 8000 of these troops, less than 1500 found their way back to Italy. This is the epidemic described in the admirable work of Tobias Cober.*

Again it made its appearance, as we learn from Esslinger and Hæser, among the 12,000 German troops who occupied Hungary under the celebrated General Montecuculi,† in the year 1661. The disease broke out in the swampy camp between Komorn and Neuhäusel, and soon brought the fruitless campaign to an end.

Once more it appeared in the army with which Prince Eugene besieged Belgrade in 1717. The Grand Vizier advanced to the relief of the besieged with a great army. The Turks took the offensive, and shut up Eugene, with his army of 60,000 men, in the marshy plain between the Danube and the Save. It was here that the Hungarian fever broke out, accompanied by a fatal dysentery. A large number of men had perished, when the gallant Prince, venturing all on the fortunes of a day, attacked the Turkish army and routed it after a desperate battle. The surrender of Belgrade followed, and the peace of Passarovitz was the result.

Still more terrible were the ravages of the Hungarian fever during the disastrous campaign which the Emperor Joseph II undertook against the Turks in 1788. Disappointed with regard to the help he had anticipated from Russia, and his troops decimated by pestilence, the feeble campaign terminated in a humiliating retreat. The imperial army at the commencement of the season numbered about 200,000 men; its losses from disease have been estimated at between 30,000 and 40,000.

The symptoms of the Hungarian fever have been described at great length by numerous writers. I can only refer to a few leading points. The patients were seized, usually during the afternoon or evening, with a slight, short chill, followed by a burning fever. This was accompanied by a headache so intense that the vulgar called the disease sometimes the head disease, (Haupt-krankheit;) the raging brain disease, (Hirntobende-krankheit;) or the head-misery, (Kopfwehe.) So prominent was this symptom that in the earlier autopsies medical men sought for the cause of the affection chiefly in the encephalon, and, deceived either by the congested appearance of the choroid plexus, or by the presence of vermiform clots of blood or fibrin in the ventricles or in the great

* Tobiæ Coberi. *Obs. Med. Castrensium Hungaricarum. Decades tres.* (Edition of H. Meibomius.) Helmstad, 1683.

† See *Mémoires de Montecuculi.* Nouv. ed. Amsterdam and Leipsic, 1756. Lib. III, ch. 1, p. 321.

sinuses, actually supposed they had discovered worms in the brain, and gave to the disease the designation "Cerebri vermis" or "Hirn wurm." With the headache came on a pain in the epigastrium so intense that the appellations "Herzbräune" and "Herzbreun," were widely employed. Soon the fever was accompanied by a raging delirium; the tongue became dry and covered with a brown coat, from whence the vulgar names "Braüne" and "Pestartige Bräune," already mentioned. Hæmorrhages from the cracked tongue or from the gums were common. Then, there was also the characteristic typhus eruption of the skin, accompanied by petechiæ, whence the disease was called "Febris Lenticularis," especially by the Italian physicians. In cases which recovered, the favorable crisis usually occurred on the fourteenth or twenty-first day, but fatal cases often terminated much earlier. In some cases gangrene of the extremities occurred.

All these symptoms, together with the unmistakable contagion, certainly point to spotted typhus; but from a very early period, cultivated physicians, like Sennertus, for example, have pointed out that this fever differed in several marked particulars from ordinary spotted typhus. The most striking differences were its tendency to present a decidedly remittent type in its earlier stages, and the accompanying gastric symptoms, bilious vomiting and the like. Even Rulandus,* who was disposed to identify the disease with the febris lenticularis of the Italians, was obliged to admit that during its early days it frequently presented, in a decided manner, the type of a simple or double tertian fever. A common form was the semi-tertian, to which the old Greek physicians gave the designation Hemitritæus; and hence the Hungarian fever has sometimes been described as the Hemitritæus Daciæ.

So marked were these symptoms that Sauvages,† the great Nosologist, classes the "Amphimerina Hungarica," as he calls it, among the remittent fevers. The learned Naumann‡ goes so far as to declare that the Hungarian fever is at the bottom merely the common summer fever which occurs every year in Hungary, the valley of the Danube, and Southern Russia, and attains malignity only in epidemic years. Among modern epidemiologists, while Ozanam§ still clings to the notion that

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* Martin Rulandus. *De Morbo Ungarico.* Lcipsic, 1610. Consult Cap. I, p. 9, where, after intimating that these remissions are deceptive in their character, (falsa specie,) the author admits that in the case of Baron Reinhard, who died of the Hungarian fever, he supposed, during the earlier history of the case, that he was dealing merely with a double tertian. For his argument in favor of the identity of the Hungarian fever with febris lenticularis, see Cap. VIII, § XX, p. 376. Consult further, Cap. VIII, quæstio 39, p. 510, for argument against the supposition that the Hungarian fever has truly a tertian or quartan type.

† F. Boissier De Sauvages. *Nosologia Methodica.* Amsterdam, 1768, Tom. I, p. 327.

‡ Moritz Ernst Adolph Naumann. *Handbuch der Med. Klinik.* Bd. III, Abth. 1, (Berlin, 1831,) S. 293.

§ Ozanam. *Hist. Méd. des Maladies Epidémiques.* 2me. Edit., Paris, 1835, Tome III, p. 127.

Hungarian fever was merely typhus, both Hecker and Hæser* express the opinion that it was typhus, modified by the intense malaria of the Hungarian plains.

Side by side with the Hungarian fever a chronic affection occurred among the German soldiers in Hungary, which, like the Hungarian fever, was often spoken of as the Hungarian disease. (Morbus Hungaricus, or Lües Pannonica.) This was the celebrated Languor Pannonicus, or Asthenia Pannonica.† It was a profound debility, accompanied with a disgust for food, unwillingness for exertion, diarrhœa, and pains in the back. It attacked large numbers of men, and not unfrequently proved fatal. I suppose it to have been the joint effect of chronic malarial poisoning and a scorbutic taint. Much in the old descriptions reminds me of a certain group of cases of general debility which were common enough in our own war. These, too, were rebellious to treatment so long as the patient remained in the malarial region, but recovered promptly, like some of the cases of Languor Pannonicus described by Tobias Cober, so soon as the patients escaped to a healthier atmosphere and better diet.

Dysentery was another camp disorder which proved fatal in the Hungarian campaigns. It is mentioned by various writers, as for example, by Cober, but does not appear to have attracted as much attention as it probably deserved.

I cannot dwell further in this discourse on the story of the Hungarian camp diseases. I have said enough to indicate that the chief difference between these diseases and those of our own camps during the war of 1861-'5 consisted in the prevalence of spotted typhus in Hungary instead of abdominal typhus, which was the form from which our armies suffered. The degree of malarial complication must have been very similar. The extent to which any scorbutic complication existed is difficult now to ascertain. Almost all the writers complain of the food and cooking of the Hungarian camps; but the soldiers would appear to have had fresh meat in some abundance, for one of the constant complaints is that they persisted in cooking it too soon after killing. Scurvy, of a marked kind, however, does not appear to have occurred, and the most significant evidence of the frequent existence of a scorbutic taint is, after all, the constant development in every army, after a few months' campaigning, of numerous cases of the Languor Pannonicus.

Of late years we have heard but little of this once dreaded scourge, which only now and then attracts the attention of some medical writer

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*Cited above.

† For a description of the languor pannonicus, see particularly the work of Cober, cited above. Consult, also, Sauvages, *op. cit.*, Tom. I, p. 802.

whose tastes incline to historical studies. I cannot but believe, however, that whenever a German army goes again into the valley of the Danube, as perhaps may happen before long unless the present disturbances in the Danubian provinces are fortunately brought to a peaceful termination, the old Hungarian plagues will once more appear in its ranks—a more formidable foe to be encountered than the sword of the Turk.

I have thus presented to you a couple of striking illustrations of the hybrid disease resulting from the complication of malarial influences with the causes of spotted typhus. Let me next refer to some examples of the similar complication with typhoid fever.

The first instance to which I shall refer is the epidemic of the so-called morbus mucosus, which occurred at Göttingen during the years 1760–'61, and which has become famous, less on account of the extent of the mischief done than because of the admirable description which we owe to two teachers in the Medical department of the Göttingen University, Röderer and Wagler.* The summer of 1760 was warm and rainy; the winter which followed was wet, with notable vicissitudes of cold and mild weather. Besides the inhabitants, a garrison of French troops, numbering, with the camp followers, about 8,000, was shut up in the town. Röderer and Wagler have drawn a striking picture of the want of food, the uncleanliness, the general misery that prevailed. Already by the middle of July, 1760, intermittent fevers, sometimes of mild type, sometimes, however, of marked malignity, occurred to a degree unusual in that region. During August the intermittents continued to be prevalent, but malignant forms became more numerous, and many of the cases assumed a continued type. At the same time a malignant dysentery made its appearance, and raged with fatal results till the month of November. The intermittents meanwhile had continued, but during the month of November both these and the dysenteries were gradually replaced by the morbus mucosus, which became the prevailing disease, and continued as an epidemic all winter. During April and May, 1761, it was again, to a great extent, replaced by intermittents, but still scattered cases continued to occur during the summer. In the autumn, intermittents again became the common disease, occurring often in a malignant form; and small-pox, which had first appeared during the summer of 1761, assumed epidemic proportions during the winter of 1761–'2.

The mucous fever was a continued fever, which in severe cases was often prolonged beyond the twenty-first day, sometimes till after the

* J. D. Röderer et C. G. Wagler. *De Morbo Mucoso.* Göttingen, 1762.

thirtieth, though fatal cases often perished as early as the ninth. In its earlier stages it usually presented a decidedly remittent type, tertian, double tertian, or semi-tertian being the most common varieties. Sometimes, as the patients convalesced, the continued fever passed into an ordinary intermittent before recovery took place. After the fever was fairly under way it presented many of the symptoms of ordinary typhoid fever. Delirium, frequent, feeble pulse, diarrhœa, meteorism, in the worst cases petechiæ, made their appearance. At the beginning the tongue was furred, and its swollen, red papillæ projected through the fur; it became brown and dry as the disease progressed. Hæmorrhages from the nostrils sometimes took place, especially about the sixth day; still more frequent were hæmorrhages from the bowels. It is a significant fact that the extract of Peruvian bark often proved highly efficacious in those cases in which the remissions were most marked.

The disease derived its designation from the belief that an excessive secretion of mucus from the alimentary canal was its most characteristic phenomenon. This was manifested by the frequency with which mucous vomiting, with or without bile, occurred at the inception of the cases, just as we know it does in ordinary remittent fever. The diarrhœa was interpreted as but another expression of the excessive mucous secretion, and the dead lumbricoid worms which were often noticed in the stools, or during the progress of autopsies, were supposed to have been bred in consequence of the morbid excess of mucus in the alimentary canal. In the autopsies, the closed glands of the stomach and small intestines were usually found tumefied to a marked degree. This was erroneously supposed to be the consequence of an accumulation of the mucous secretion in their interior. Röderer and Wagler have published three remarkable copper etchings of the appearances they observed. The lesions they have figured are not those characteristic of typhoid fever, but of ordinary intestinal catarrh. In one of the autopsies (No. V) they describe the agminated glands, near the ileo-cæcal valve, as marked with black pigment, quite like the condition often observed in our own war, and described as "the shaven-beard appearance." The mesenteric glands were enlarged. The anatomical evidences of peritonitis were often present. Dysenteric sloughs frequently existed in the colon. Nowhere, however, do I find any description of the bulky tumefaction, ulceration, and sloughing of the glands of Peyer, which is characteristic of typhoid fever. Nevertheless, I am by no means sure that this essential lesion did not exist in some of the cases at least. It must be remembered that the typhoid lesion was not then known as we know it now. Perhaps some of the gangrenous spots, of smaller or greater size, which our authors describe as having been observed in the small

intestines of some of their cases, were really of this nature.* This appears to me the more probable, because in the case of the very similar epidemic which Sarcone† observed in Naples in 1764, and which, in the circumstances under which it occurred, its course, symptoms, and the anatomical lesions observed after death, appears to have been identical with the morbus mucosus of Röderer and Wagler, I read that these gangrenous spots were again observed in the alimentary canal of some cases, and that they occurred chiefly in the small intestines. But even if this interpretation is correct—and I believe it is—I cannot think that the characteristic typhoid lesion was present in all the cases in which Röderer and Wagler made autopsies, or it surely would have received greater attention from those acute observers, and I must think that in a part, at least, of their cases, there was no other lesion of the small intestine than a smart intestinal catarrh.

The doctrine of the mucous fever, as taught by Röderer and Wagler, took firm root in the medical mind of Europe.‡ It figures largely in many of the text-books of the first half of the present century, and you will even find the descriptions reproduced, without criticism, under the head of "Mucous or pituitous fever," in the admirable Dictionary of Copeland.§ Some writers have expressed the opinion that this mucous disease was after all neither more nor less than ordinary typhoid fever.‖ I cannot agree with them. I see in the story, as told by the original observers, unquestionable marks of malarial complications; indeed, also of scorbutic complications. I do not marvel that the Göttingen observers should have devoted sections of their work to the discussion of the relationship of the mucous disease with intermittent fever, and of its relationship with scurvy, and should have arrived at the conclusion, to use their own striking language, that the epidemic which they observed was the corrupted and degenerate progeny of intermittent fever. They thought they saw also a causal relationship between intermittent fever and dysentery, an opinion which I cannot discuss here, but which I must confess I share to a certain extent. No doubt, since their time, the term mucous fever has often enough been applied to simple typhoid fever, and although of late it has been banished from the books, it still survives among certain practitioners who were educated thirty or forty

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* *Op. cit.*, p. 162.

† Michael Sarcone. *Istoria ragionata dei mali osservati in Napoli, nel corso dell' anno 1764.* Naples, 1764. There is a German translation by Fuesslin, Zurich, 1772, and a French translation by Bellay, Lyons, 1804. Our library contains the German translation only.

‡ Ozanam. *Op. cit.*, Tom I, p. 257 *et seq.*, gives an excellent abstract of the works of Röderer and Wagler, and of Sarcone.

§ James Copeland. *Dict. of Pract. Med.*, London, 1858, Vol. I, p. 988.

‖ As for example, W. Griesenger. *Infections-Krankheiten.* Virchow's Handbuch der Spec. Path. u. Therapie. Bd, II, abth. 2. Erlangen, 1857, S. 118.

years ago, and I myself have heard it applied by old practitioners to unmistakable cases of typhoid fever within the last five years. The misuse of terms in medicine is, however, a common consequence of imperfect knowledge, and we must not allow ourselves to be led astray by it.

I cannot dwell longer now upon this interesting epidemic. Let me turn next to another illustration, in which the malarial element was still more potent, and with regard to which I need only present a few salient points, because it is so often cited in connection with the diseases of armies that most of the leading facts must be well known to you all. I refer to the Walcheren fever, which decimated an English army in the year 1809.

The previous experience of English armies in the Netherlands had shown the malignant character of the malarial influences which prevail in that region. It had been described in striking language in the excellent work of Sir John Pringle.* He had recorded that all the flat region between the rivers Lys and Scheldt and the sea, was marshy and unhealthful, the home of periodical fevers; that a great part of Holland, including Dutch Brabant, was subject to the same disorders, and that the air was worst of all in Zealand. He has left graphic descriptions of the fevers which prevailed among the English troops operating in these low countries between 1742 and 1748. He had observed especially that when the troops were encamped near stagnant waters the "marsh fevers are not only apt to begin with little remission, but, after intermitting for some days, to change into continued fevers of a dangerous nature."† Especially was this the case during the summer and autumn of 1748, when the troops were encamped near the inundations of Dutch Brabant. An epidemic of such fevers occurred among them. Pringle writes: "At the height of the epidemic it appeared that both intermittents and remittents, by extending or doubling their paroxysms, frequently changed into a continued and dangerous form, and that most of those we lost died in this way. These men, as we remarked, had a corrupted smell for a day or two before their death, and soon after, their bodies putrefied. Some had petechial spots, though the place where they lay was neither crowded with sick nor too close; and to these spots were added some other symptoms, the same with those of the hospital fevers."‡

The expedition of 1809 renewed the experiences of Pringle on a more formidable scale. The English army, of between 42,000 and 43,000 men, was quite healthy when it set sail from the Downs, July 28th, but

* Sir John Pringle. *Obs. on the Diseases of the Army.* 7th Edit., London, 1774, p. 1, *et seq.*
† *Op. cit.*, p. 173.
‡ *Op. cit.*, p. 181

as early as the middle of August the number of the sick was so great as to excite alarm. By the 26th the number was 5,000. By the 7th of September it amounted to 10,948. According to Sir Gilbert Blane,* 26,846 men were sent to hospital in Zealand between the 21st of August and the 18th of November. The expedition was paralyzed by these misfortunes, and after the surrender of Flushing, August 15th, was unable to continue offensive operations. In spite of the fact that a large part of the sick who were sent home to England began to improve so soon as they escaped from the pestilential regions in which their diseases had originated, and ultimately recovered, the total mortality was large. It has been estimated at about 8,000 men. I must refer you to Hansard's Parliamentary Debates, the Annual Register, the Edinburgh Review, and the Essays of Marshall, Sir Gilbert Blane, Dawson, Davis, and Wright † for the particulars of this disastrous expedition. I can only pause to emphasize a few facts.

The diseases of the Walcheren expedition were diarrhœa, dysentery, intermittents, and a form of fever which began as a remittent, and subsequently assumed a continued form, and which at that time was designated the Walcheren fever, or the Walcheren remittent. Sir Gilbert Blane, who visited the island of Walcheren during September and October, reported to the Government "that he found so great a proportion of the sick to consist of those affected with the intermitting and remitting fevers peculiar to marshy countries, that there could be no doubt that the sickness of the army was owing to that cause." He admits, however, that he found a certain number of cases of a fever which he called "typhus," and of dysentery, particularly at Flushing, where "the prevalence of these two diseases was very remarkable, particularly in one regiment, of which all the medical officers were either absent or dead, and of which the sick, originally affected with the endemic disease, were suffering also from typhus and dysentery in consequence of the want of cleanliness, as well as of proper medicines, diet, and attendance."‡ Borland and Lempriere,§ two other medical officers serving with the

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*Sir Gilbert Blane. *Facts and Obs. respecting Intermittent fevers, and the exhalations which occasion them.* Med. Chir. Trans. Vol. III, (1812,) p. 11.

†Hansard's *Parliamentary Debates.* Series I, Vol. 15, Appendix 22 and 23, and Vol. 16, Appendix "Papers relating to the Expedition to the Scheldt." *The Edinburgh Annual Register for* 1809. Edinburgh, 1811, Vol, II, part 1, p. 660. *The New Annual Register for* 1809. London, 1810, p. 316. *Observations on the documents, including the evidence heard at the bar, laid before Parliament on the subject of the late Expedition to the Scheldt.* The Edinburgh Review, Vol. 17, (1810-'11,) p. 331. Henry Marshall, *Contribution to Statistics of the Sickness and Mortality which occurred among the troops employed in the Expedition to the Scheldt in the year* 1809. Edinburgh Med. and Surg. Jl. Vol. 48, (1837,) p. 305. Sir Gilbert Blane, *op. cit.* Davis, Wright, and Dawson—works cited below.

‡ *Op. cit.*, pp. 2 and 3.

§ J. Borland and W. Lempriere. *Report on the prevailing Malady among his Majesty's Forces serving in the Island of Walcheren.* The Med. and Physical Journal, Vol. 23, (1810,) p. 183.

troops on the island, reported, in the same spirit, that the malady was "the endemic fever of marshy countries; the effect of miasmata from a soil the most productive in deleterious exhalations of any perhaps in Europe;" stated that it prevailed also among the natives of the island as an intermittent or remittent fever, and that among the British troops it assumed "a character of greater malignancy."

But the most elaborate studies of the Walcheren fever were made by the medical men whose duty it became to treat the sick who were sent home to England. Dawson* tells us that the Walcheren soldiers were affected with intermittents in a number surpassing those who were attacked by the continued fevers; that many of the soldiers who were subjects of the continued fever had already labored under the intermittent, and that on the other hand intermittents were common among those who had recently recovered from the continued fever. Davis,† whose account of the fever is more elaborate, tells us that at the beginning it assumed the quotidian, tertian, double tertian, or quartan type, but that the most common of all was the double tertian. It assumed, however, the characters of a continued fever of typhoid type as it progressed, with muttering delirium, small rapid pulse, dry, black tongue, sordes-covered teeth, fœtid odor, and black discharges from the bowels.

On account of the frequency with which this fever was associated with dysentery, the characteristic lesions of dysentery were frequently found in the colon during the autopsies which were made. But Davis‡ has also recorded the significant fact that "the ileum and jejunum were frequently interspersed with tubercles, inflamed and ulcerated in different parts." This description would seem to indicate beyond doubt that the lesions, which we have now learned to recognize as characteristic of typhoid fever, were frequently present in the cadavers of those who had perished from the Walcheren disease. After a thoughtful study of the evidence, no doubt is left in my own mind that this fever was not, as has often been asserted, simply a malignant remittent, but that it was a genuine hybrid between malarial and enteric fever.§

Did time permit, I might bring forward other interesting illustrations from the history of the British Army in the East and West Indies and elsewhere, from the Algerine experience of the French, and from other sources; but I fear that I have already occupied too much of your time

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*G. P. Dawson. *Obs. on the Walcheren Diseases.* London, 1810, p. 70.

†J. B. Davis. *A Scientific and Popular view of the Fever of Walcheren.* London, 1810. See also Thomas Wright. *History of the Walcheren Remittent.* London, 1811.

‡ *Op. cit.*, p. 192.

§ Essentially the same opinion with regard to the Walcheren fever has been expressed by J. J. Levick. *Miasmatic Typhoid Fever.* American Jour. of the Med. Sciences, April, 1864, p. 409.

with facts of this class. I cannot, however, leave the subject of the experiences of other armies without bringing to your notice an unexpected corroboration of the views I am urging upon your attention, which I find in an essay published by Virchow in 1871 on the fever and dysentery of the German army* during the recent war with France, which he contrasts with the similar diseases of our own civil war, as described by me in my book on Camp Diseases, and in Circular No. 6. Virchow hesitates to acknowledge "typho-malarial fever" as a special group of diseases, and exclaims, with cautious conservatism: "It seems to me we ought to be very careful in this direction." Yet, in the same essay, while contending that the prevalent fever of the German army was simply abdominal typhus, as proved by numerous *post mortem* examinations made at Berlin on soldiers brought back sick from the front, this cautious but acute observer finds himself compelled by the facts under his eyes to use the following emphatic language:

"Nevertheless, abdominal typhus affords such numerous diversities in its course that it is in the highest degree imperative to preserve every precaution in the interpretation of individual cases. Especially does the admixture (Zumischung) of the malarial element, which also in this war has shown itself active, by numerous cases of intermittent fever, confuse the picture of the so-called normal course of typhus in a sometimes very deceptive manner."

Now, I must protest that these words represent the very essence of the doctrine I am here to defend, and if the comparatively mild malaria of the plains around Métz was capable of complicating the course of the abdominal typhus which occurred in the German army to a sufficient extent to justify this eloquent language, what think you would the great pathologist have written could he have observed for himself the fevers of our own army in the valley of the Mississippi or by the banks of the Chickahominy?

I have occupied the greater part of my hour with these preliminary matters; but not, let me hope, in vain. I come now to a rapid sketch of the principal facts with regard to the typho-malarial fever of the civil war of 1861–'5.

The characters and distribution of the malarial fevers of the region in which that colossal struggle took place have been described in a most original and interesting work by our countryman, Dr. Daniel Drake,† who has embraced them under the general designation of autumnal fevers. This term serves very well to express the greater prevalence of

* R. Virchow. *Kriegstyphus und Ruhr.* Virchow's Archiv., Bd. LII, (1871,) S. 1. Note, pp. 5 and 30.

† Daniel Drake. *The Principal Diseases of the Interior Valley of North America.* Cincinnati, 1850. The same, *second series*, edited, after the death of the author, by S. H. Smith and Francis G. Smith. Philadelphia, 1854.

intermittents and remittents during the autumn months; but it must be distinctly understood that their occurrence is not limited to these months. In the regions in which they are endemic, they may occur at any season of the year, and their course can be represented by a curve in which the abscissas begin to lengthen early in the spring, and grow longer and longer, till they attain their maximum most generally at sometime during September or October, after which the curve rapidly drops to a minimum during the winter. Sometimes the curve presents, also, a slightly irregular elevation during the early spring, justifying the term vernal intermittents, which has often been used; but most generally the increasing frequency of these fevers in the spring simply represents the commencement of the annual rise in the curve which culminates in the autumn. This is well illustrated by curves which I have had constructed to represent the monthly number of new cases of agues and remittents reported in our armies in the Atlantic and Central regions during the civil war. These I hand you for examination, but I cannot pause to discuss them at this time. Doubtless the winter and vernal cases are to be regarded in part as relapses, in part as illustrations of the postponed development of the consequences of previous exposure; but, however you may choose to interpret them, I wish to insist upon the point that they occur with much greater frequency than some of the systematic writers would have us believe.

Dr. Drake has shown that in a general way these fevers are most intense in the States that border on the Gulf of Mexico, and gradually diminish in frequency and severity as we go to the north, so that they no longer prevail in epidemic form beyond the 44th parallel, and cease to occur even sporadically at about the 47th. To the southwest, the Cordilleras of Mexico and the Southern Rocky Mountains constitute their boundaries, while in the higher latitudes they cease on the great plains, long before we reach the mountains. On the Atlantic slope they prevail with constantly increasing severity as we go southward from New York, and though they do not occur on the table lands and higher ground of the Appalachian chain, yet they ascend high up the valleys of the streams which flow out of the flanks of those mountains.

In the volume of the Ninth Census of the United States, which is devoted to Vital Statistics,* there is an interesting map which exhibits the distribution of the mortality from intermittent and remittent fevers during the year 1870. Doubtless this mortality, which is but at best incompletely represented in the Census Report, can only be regarded as

**Ninth Census, Vol. II, Vital Statistics of the United States.* Washington, 1872. See, also, *Statistical Atlas of the United States—based on the results of the Ninth Census, 1870.* By F. A. WALKER, 1874, in which the map in question is given on a larger scale, and better engraved, as Plate 42

a very imperfect measure of the frequency and severity of these fevers; but imperfect as it is, its indications are valuable. It shows in a general way the almost complete exemption of New York, the New England States, and the mountainous parts of Pennsylvania, Maryland, West Virginia, and Virginia, and a gradual increase in severity indicated by an increasing mortality in the river valleys as we go southward from the fortieth parallel. It illustrates, also, in a striking manner, a fact which arrested the attention of Drake,* that in various scattered districts, from the influence evidently of strictly local causes, the malarial fevers display greater prevalence and malignancy than they exhibit further south and on a lower level.

It would be altogether foreign to my purpose to enter in the present discourse into any discussion as to the causes of these fevers. I simply urge upon you to-day the great fact of their endemic existence, in some localities more frequently and with greater severity than in others, formidable even to the natives of the soil, but still more formidable to strangers, throughout the whole region in which our great armies operated during the civil war. The characters of the fevers thus distributed are too well known to you all for any description to be necessary here. I need only remind you of the frequent occurrence throughout the Southern States, side by side with ordinary ague, of malignant forms, the so-called congestive chills or pernicious fever; of the severity of the remittent fevers which prevail; of the frequency of big spleens, disordered livers, and malarial anæmias, and of the great frequency with which, in these regions, an intermittent type is impressed on the ordinary acute phlegmasiæ, and even on chronic disorders.

Drake has also presented an interesting account of the distribution throughout the United States of typhoid or, as he calls it, typhous fever.† This fever is the usual form in which typhus manifests itself in the United States. The spotted typhus of the Old World never appears on our soil except as isolated cases, imported, as "ship fever," into our seaports. Drake has correctly pointed out that while in a general way the typhoid fever of the United States is more prevalent in the Northern than in the Southern States, it nevertheless does occur both sporadically and in local epidemics even in the southernmost portion of our territory. This fact is strikingly illustrated by a map in the volume of the Ninth Census already referred to,‡ which represents the distribution throughout the United States, during the year 1870, of some 24,000 deaths from typhoid fever. In constructing the map a few hundred cases of

* *Op. cit.*, First series, p. 704.

† *Op. cit.*, Second Series, p. 358 *et seq.*

‡ See also Walker's Statistical Atlas, cited above, Plate 46.

cerebro-spinal fever were included, but their number is too small to vitiate its value* in illustrating the distribution of typhoid fever during the year in question. This map, while exhibiting in a general way a gradual decline in the mortality from typhoid fever as we go to the South, displays also a number of limited areas of high mortality, representing the endemic prevalence of the fever during that particular year in certain localities. Several of these areas of local prevalence are situated in the Southern States. In one of them, in Georgia, which embraces the region drained by the Altamaha and Satilla rivers, typhoid fever caused about one-fifth of all the deaths—a greater mortality than it produced in any part even of the New England States. In another almost equally remarkable area, embracing parts of the States of Mississippi and Alabama, having near its centre the town of Columbus, Mississippi, the proportionate mortality from typhoid fever was nearly as great.

Drake has urged, as one of the distinguishing marks between typhoid fever and the autumnal fevers, that the former is not limited like the latter to a particular portion of the year, "between the summer and winter solstice, but occurs, though unequally, at every season." But he believes that "on the whole, however, they are most prevalent in autumn and winter,"† an opinion which has been shared by several careful writers.‡

Liebermeister§ has recently compared the statistics of the monthly prevalence of typhoid fever in some of the great European cities, and shown that in London, Berlin, and Basle, the curve which represents the course of the disease is distinctly autumnal in character. "The minimum is in February and April, (in the Berlin curve a little later;) the maximum is in September and October. (In Berlin, the maximum is in October.") Munich alone presented an exception, the maximum falling in February. Now, I must say, my study of the sick reports of our civil war inclines me to believe that the autumnal curve observed by Liebermeister represents also the usual annual distribution in this country. I have constructed curves representing the monthly ratio of new cases to strength in each of the three regions. These curves present certain irregularities in the Atlantic and Central regions corresponding to the varying circumstances in the fortunes of the great armies, but on the whole they represent the disease as most prevalent during the latter

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* *Ninth Census*, Vol. II, cited above. Special tables of Mortality, p. XXIII. The number of cases is, enteric fever, 22,187; typhus fever, 1,770; cerebro-spinal fever, 650. The cases reported as typhus were simply misnamed, and are to be regarded as enteric.

† *Op. cit.*, 2d Series, p. 358.

‡ See, for example, G. B. Wood. *Treatise on the Practice of Medicine*. 6th Ed., Philadelphia, 1866, Vol. I, p. 383.

§ Liebermeister. *Typhoid Fever*, in Ziemssen's Cyclopædia of the Practice of Medicine, Amer. transl., Vol. I. New York, 1874, p. 65.

part of the summer and autumn, rather than during the autumn and winter. In the Pacific region the curve is strictly autumnal. The maxima are as follows: October in 1861, September in 1862, November in 1863, September in 1864, October in 1865. The minima were in April and May for 1862 and 1863, April, 1864, and March, 1865. In the Atlantic region the maximum for 1861 was in November. In 1862 there were two maxima, one during the Peninsular Campaign in July, followed by a great reduction on the withdrawal of that army, and a second maximum in October and November. In 1863 and 1864, the maxima were during July and August. In 1865, during October. The minima fell in March, 1862; June, 1863; February, 1864; and April, 1865. In the Central region the maximum for 1861 fell in November; in 1862, in May. During 1862 the curve was quite irregular; it rose to a maximum in May, then diminished in frequency during the summer, and steadily increased after September through the winter, attaining its maximum in February, 1863, after which it diminished until June, and then again increased to a second maximum in August. The maximum for 1864 fell in September; in 1865, during September and October. The minima were in March and September, 1862, June, 1863, February in 1864 and 1865.

I find from the Annual Reports of the Board of Health of the city of Boston, for 1874 and 1875, that the mortality from typhoid fever during those years pursued a markedly autumnal course, the maximum being during September in 1874, and during October in 1875.* In the District of Columbia the registration returns show that the greatest number of deaths since 1872 have always occurred during the months of August and September.

I incline, therefore, to the belief that typhoid fever presents in fact in this country an annual autumnal curve very similar to that of the so-called autumnal fevers. I base upon this circumstance no argument as to the relationship or nature of either disease, but press it upon your attention as a fact which must not be overlooked.

Next, let me remind you of the important fact that intermittent and remittent fevers often disappear more or less completely from neighborhoods in which they have long prevailed, and are replaced by typhoid fever. This circumstance could not escape such a faithful observer as Drake. He has described it in the following language:

"Far in the North, remittent fever often presents, almost from the beginning, a tendency to the continued type, displaying the character-

*See *Second Annual Report of the Board of Health of the City of Boston*, 1874, and *Third* ditto, 1875. Both volumes give charts representing the weekly mortality from typhoid fever. Also, *Annual Reports of the Board of Health of the District of Columbia* for 1872, 1873, 1874, and 1875.

istics of the synochus of Cullen's Nosology. It is properly called autumnal fever, because it prevails most in that season, and is an equivalent for the true remittent fever of the warmer climates. Nearly the same remark is applicable to this fever when, in the middle latitudes, it appears in the long-cultivated and drier portions of Tennessee, Kentucky, western Pennsylvania, and Ohio. Formerly it often abated into an intermittent; latterly, it is apt to degenerate into a continued type."*

Whatever criticism you may choose to bestow on the wording of some parts of this remarkable passage, it is an honest attempt by a keen observer to describe a class of facts which he had had the opportunity of observing on a great scale. The substantial truth, that in numerous districts throughout this land intermittents and remittents were the prevailing form of fever when the first settlements were made; that as time passed by and cultivation progressed, the intermittents diminished in frequency, the remittents exhibited more and more a disposition to pass into continued forms, and finally were replaced by ordinary typhoid fever, which became the prevailing endemic fever—all this, I suppose, has occurred under the personal observation of many of the American physicians who listen to me to-day, and I need not weary you by multiplying authorities in proof of a fact with which you must all be familiar.

But next let me observe that the change thus effected is not always a permanent one. Often in individual years the intermittents and remittents reappear in epidemic-wise in regions such as I have just described, and then the typhoids vanish for a time, to return once more when the temporary prevalence of the periodical fevers comes to an end.

Existing thus side by side, replacing each other in this intimate—if you will, in this intricate manner—it is evident that the unknown causes of the periodical fevers, and of typhoid fever, whatever they may be, must frequently coexist. Ought we not, then, to anticipate that individuals exposed to both would often suffer with fevers in which phenomena belonging to both affections would also coexist?

I suppose the once popular belief that diseases are entities, and that a man can suffer from but one at a time, is now so completely dead that it is quite unnecessary for me to bring forward facts and arguments to disprove it. I suppose it to be now well established that individual cases of disease are always more or less complex, representing in every instance the total effect of all the morbific causes acting upon the individual, and modified always by his individual resisting power, the result of his own individual organization and his own previous history. Even Sauvages, the greatest of all the systematic nosologists of the last century, already recognized this fundamental fact when he exclaimed, in

* Drake. *Op. cit.* First Series, p. 781.

the introduction to his work: "Genera and species of diseases are abstract notions. Throughout the Universe neither genera nor species exist, but only individuals."* Is it wonderful, then, that hybrid forms of disease, exhibiting the ordinary symptoms of malarial and of typhoid fever, variously combined, should long have been observed in this country? In fact, such hybrid forms have long been observed in Europe also. In the first volume of his Institutes, published in 1781, Burserius† recognized them as a group: "the Proportionata," which he defines as a compound species composed of the synochus and intermittent fever. This union, he says, occurs especially "when intermitting fevers prevail epidemically, or at least constitute the prevailing and stationary disease; for then almost all diseases bear some resemblance to intermittents, or sporadic, or intercurrent fevers, of whatever other kind, are combined with the intermitting fevers."

Hermann Schmidt,‡ in his account of the so-called Summer fever, which was epidemic throughout Europe during the year 1827, has still more elaborately described as the form of fever then most generally prevailing, a combination of intermittent fever with the endemic typhus of Europe, (our typhoid fever.) He has subdivided the resulting hybrid forms into two chief classes: 1. *Typhus intermittens subintrans*, which he defined as a combination of typhus and intermittent fever, with a predominance of the typhus element. 2. *Febris intermittens typhosa*, which he defined as a similar combination, with a predominance of intermittent fever. I would refer you to his elaborate treatise for many suggestive details.

Naumann§ has quoted, with approval, the views of Burserius and Schmidt, and mentions corroborative observations by several other writers, to which I might add many more did the scope of this discourse permit.

Recurring to the American experiences, I would recall to your memory the fact that the existence of the hybrids under consideration did not escape the practical eye of Drake: "When remittent fever terminates fatally in one or two weeks," he observes, "a certain amount of subsultus, a dryness of the tongue, and intestinal hæmorrhage, are sometimes present, although no typhous fever may be prevailing in that locality, and this brings us to inquire, not into the distinctive peculiarities of these two forms of fever, but into their combination, into the hybrid or

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* SAUVAGES. *Nosolog. Method.* Amsterdam, 1768. Vol. I, p. 26.

† J. BAPT. BURSERIUS. *Institut. Med.* Vol. I. Milan, 1781. I quote from Hecker's Edition, Leipsic, 1802, Vol. I, p. 522.

‡ HERMANN SCHMIDT. *Über das Europäische Sommerfieber.* Paderborn and Arnsberg, 1830.

§ C. H. NAUMANN. Bd. III, Abth. II, S. 795.

mongrel diathesis which results from the joint impress, in ever-varying proportions, of the causes which produce true typhous and true remittent fevers."* For these hybrid forms he proposes the designation, "Remitto-typhous or secondary typhous fever." "I do not recollect," he says, "to have seen a case of fever well-marked as typhous in the early stages terminate as an intermittent, nor a decided intermittent degenerate into a typhous. The union is between remittent and typhous." And this certainly is the most common combination; but the combination with intermittent does also occur, though less frequently, and both the possibilities which Drake tells us he never observed were seen often enough during the civil war.

The same combination of remittent and typhoid fever which was observed by Drake has also been described by the late Professor Dickson of this city. Dickson continually emphasized the doctrine of the frequent blending of those febrile types which are "connate in cause and analogous in symptoms." He tells us that "it is a matter of familiar remark, that in long-protracted cases of the ordinary remittent of malarious regions, there is a domination of the palpable contrast or alternation of the period of febrile exacerbation and unison—a tendency in the former to continuousness, the latter being less an alleviation of the symptoms—and the several symptoms themselves approaching more and more in appearance those which belong to simple continued fever, nervous fever, or typhoid fever. In common professional language, such cases 'take on the typhoid character.'" "On examination, typhoid lesions will sometimes be found in the body dead of bilious remittents. The mucous membrane of the stomach and intestines is highly injected in severe and short attacks. In more protracted cases, follicular ulceration may be found throughout the whole extent of the bowel."†

Similar opinions were long entertained by my revered preceptor, Dr. George B. Wood. He has told you that remittent fever "is sometimes of a low, adynamic or typhous character from the commencement. This may be the result of a previous exposure to causes calculated to depress the vital powers and to deprave the blood; but it probably most frequently arises from the co-operation of a typhoid epidemic influence with miasmata." He did not believe that the characteristic lesions of typhoid fever ever occur in pure remittents, as some have reported, and explained their observations by the remark that "there is reason to believe that enteric fever has sometimes been mistaken for bilious or remittent fever,

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* Drake. *Op. cit.* 2d Series, p 556.

† Samuel Henry Dickson. *Elements of Medicine.* Philadelphia, 1855, p. 191. See also his Essay *On the Blending and Conversion of Types in Fever.* Trans. of the Amer. Med. Association, Vol. V, (1852,) p. 127.

and lesions belonging to the former been placed to the account of the latter; and not unfrequently, in all probability, the two diseases are in greater or less degree mingled together."*

Now, under the conditions which existed in the camps of our armies during the late civil war, these hybrid combinations, which had already attracted the attention of such men as Drake, Dickson, and Wood, in civil life, made their appearance, as might have been predicted, on a great scale, and produced, as I have already shown, a formidable mortality. It was for these hybrid forms that I proposed the term typho-malarial fever. I never meant this term to represent a specific type of fever, but intended it to designate all the many-faced brood of hybrid forms resulting from the combined influence of the causes of malarial fevers and of enteric fever. The term corresponds essentially to the "Proportionata" of Burserius. It includes both the "Typhus intermittens subintrans" and the "Febris intermittens typhosa," of Hermann Schmidt, and the "Remitto-typhous" of Drake. These are merely varieties of the group of hybrids, all of which I intended to embrace. I pointed out, in my book on Camp Diseases, that this whole group might be conveniently divided, for the purpose of study, into—1. Fevers in which the malarial element, without being the only pathological condition present, is the predominant one; and, 2. Fevers in which the typhoid element is evidently predominant, although the others are also present in a more or less distinct manner. To these I felt compelled to add a third group, namely, "Fevers of either of the first two varieties, in which from the first, or at some time during the progress of the affection, the scorbutic element becomes predominant." To this general grouping of the cases, with all the light of subsequent experience, I must still substantially adhere.

In the group of cases in which the malarial phenomena predominated, the disease began as a simple intermittent or remittent fever, of quotidian, tertian, or quartan type, the most frequent form being a simple or double tertian; but after a week or ten days the fever assumed a more or less completely continued type, with many of the phenomena characteristic of typhoid fever, such as diarrhœa, abdominal tenderness, meteorism, muttering delirium, subsultus tendinum, dry, brown tongue, and the like. But even when the typhoid phenomena were most pronounced some of the most characteristic of them were often wanting. Thus, sometimes there was no diarrhœa at all, but constipation instead. The characteristic tache rouge, or rose colored eruption, was generally entirely absent; gastric disturbance, hepatic tenderness, and an icteroid

* Wood. *Op. cit.* Vol. I, pp. 307 and 309.

hue of the countenance were much more generally present than in simple typhoid fever.

Now, a large proportion of these cases terminated favorably, especially, as I think, because quinine was so freely used in their treatment: the occurrence of ordinary paroxysms of ague was a frequent accident during the convalescence. And, just because of the frequency with which they recovered, I suppose, the number of autopsies in cases of this kind which I have been able to collect is much less than in cases of the second group, of which I shall presently speak. Still, I have collected a number of autopsies of cases of this kind, in which diarrhœa had been present during the fever, and in which, after it had assumed a continuous type, it had strikingly resembled typhoid fever, but in which dissection showed no other lesion in the alimentary canal than a smart intestinal catarrh. Patches of inflammation, scattered irregularly throughout both small and large intestines, and enlargement of the closed glands, often associated with pigment deposits, were the characteristic lesions. The solitary glands of the small intestine appeared as little projecting tumors the size of pinheads, which often had constricted necks, so that they resembled tiny polypi. The agminated glands of Peyer, slightly prominent, were often the seat of pigment deposit, which gave them the so-called shaven-beard appearance. Sometimes the villi of the small intestines were hypertrophied; sometimes they had pigment deposits at their apices. In the large intestine the slightly swollen solitary glands were often the seat of pigment deposits, seated either in the glands alone, or sometimes also in the surrounding mucosa, in which case the central dot of pigment was surrounded by a little pigmentary ring. When the fever had supervened, as often happened, upon a chronic flux, or where dysentery had been developed during the course of the fever, or of the convalescence, and had been the immediate cause of death, the characteristic follicular ulcerations of the colon or the phenomena of the diphtheritic process complicated the picture Great enlargement of the spleen and congestion of the liver, with or without fatty degeneration, were frequent concomitants. The condition of the intestinal canal in these cases closely resembled that which has been emphasized by Röderer and Wagler, and by Dickson. Between the simple inflammatory enlargement of the closed glands, which I have pictured, and the more luxuriant process which occurs in ordinary typhoid fever, and which most pathologists believe to be specific, every possible transition existed. I, for one, confess myself unable to draw a line between the two conditions. Anatomically, they appear to pass into each other by insensible gradations. The essential element of both is the accumulation of a swarm of migrated white

corpuscles in the closed glands, in the surrounding lymph passages, and the adjacent connective tissue, associated, doubtless, as we must infer from the study of other inflamed tissues, with multiplication of the lymph cells of the parenchyma of the closed glands by division, though it is difficult, if not quite impossible, to demonstrate this latter phenomenon in the present case. The sloughing and ulceration of the so-called typhous process is, I think, sufficiently well explained by the intensity of the process and the nutritive disturbances which thence result, without conjuring up in our imaginations an undemonstrated specific something to account for it.

The group of cases in which the typhoid phenomena predominated more closely resembled ordinary typhoid fever. They began more like it; they ran their course like it; like it, they refused to be cut short by quinine; after death they presented the characteristic lesions of the patches of Peyer. But even these cases presented, also, many phenomena which did not belong to ordinary typhoid fever. First of all, I must emphasize the manifestation of an unwonted tendency to periodicity. This was not merely an exaggeration of the daily exacerbation and remission, which we all know as a part of the history of the early stages of typhoid fever. The exacerbations assumed with great frequency a tertian or double tertian type, which has no parallel in the ordinary typhoid history. With this tendency to periodicity, the gastric and hepatic disturbances common in remittent fever were often associated in the early stages, and ordinary ague paroxysms often occurred in the convalescence. The autopsies in these cases disclosed the ordinary lesions of typhoid fever. During my earlier studies I believed that I had observed certain peculiarities in the character of the ulcers in these cases, by which they might be distinguished from the lesions of simple typhoid.* A larger experience, especially the examination of a large number of specimens received by the Medical Section of the Army Medical Museum, has convinced me that this opinion was premature. I renounce it as erroneous. There is really nothing in the lesions of Peyer's glands, in these cases, to distinguish them from ordinary cases of typhoid fever; and it was just these lesions, so well known to you all that I need not pause to describe them, which were observed in the vast majority of those fatal cases of fever occurring during the late war in which autopsies have been recorded or specimens preserved. As for the other lesions observed in these cases, tumefaction of the spleen, far beyond the degree ordinarily observed in typhoid fever, was common enough, and the pigment de-

* *Camp Diseases*, p. 102.

posits in various tissues and organs, which are so frequent in malarial diseases, were very often encountered. Moreover, the colon lesions characteristic of chronic fluxes or of acute diphtheritic dysentery were frequently associated, as is well shown by numerous specimens in our Museum.

I will not for a moment, however, countenance the sophism that, because the lesions of ordinary typhoid fever were those most frequently encountered during the war in fatal cases of fever, uncomplicated typhoid fever was the prevailing febrile form. On the contrary, as I understand it, though this was the lesion in the majority of fatal cases, the slighter lesions described in connection with the first group were those which most probably existed in the majority of the cases which recovered. Nor will I admit the fallacy that, even in those fatal cases in which the typhoid lesion was most marked, the patients are thereby proved to have died of simple typhoid fever. I will not emphasize the big spleens, pigmentary deposits, or other anatomical evidences of malarial complication. I will even admit the uncertain diagnostic value of all these phenomena in the present state of our knowledge. But I cannot ignore the facts of clinical observation. I cannot but see in the periodicity and other clinical evidences of malarial complication to which I have briefly alluded, proof of the action of an additional morbid agency, to which I doubt not we must look for one reason of the great mortality of the fever cases in our armies.

It often happened that, in fevers belonging to either of the classes I have just described, scorbutic phenomena complicated the picture, and sometimes even took a commanding place in determining the course and issue of the disease. I have affirmed, and shall elsewhere bring forward satisfactory evidence in proof of the assertion, that a mild but distinctly recognizable scorbutic taint was wide-spread among our soldiers. It manifested itself as a peculiar anæmia, accompanied by muddy complexion, large, smooth, flabby tongue, and by neuralgic or pseudo-rheumatic pains in various parts of the body, especially in the back. As a rule, it was only after this scorbutic anæmia had existed for some time, either alone or variously complicated with symptoms due to malarial poisoning, that the characteristic scorbutic conditions of the gums, the scorbutic indurations about the joints of the lower extremities, and the well-known scorbutic purpura made their appearance. These easily-recognizable symptoms of fully-developed scurvy were but moderately frequent. The preliminary anæmia, however, was common enough, though often overlooked or misunderstood.

Now, when either of the forms of typho-malarial fever, which I have described, occurred in individuals suffering under the scorbutic taint, the

symptoms were modified to a degree corresponding to the intensity of the scorbutic condition. The effect of the complication was to increase the tendency to mental and bodily prostration during the disease, to tardy convalescence subsequently, and to increase the frequency of petechial and purpuric eruptions, and of hæmorrhages from the nose and bowels. Sometimes the characteristic scorbutic condition of the mouth was developed during the progress of the fever, when it had not previously made its appearance. When the characteristic typhoid process was developed in individuals laboring under a marked scorbutic taint, the symptoms closely resembled those of spotted typhus. Fatal hæmorrhages from the bowels were common in such cases, and on the dissection, the lower patches of Peyer were found converted into dark-red or black pultaceous sloughs of considerable size and thickness. I suppose the scorbutic condition to have modified the typhoid ulceration in such cases, just as we often see it modify the condition of superficial ulcers or of gunshot wounds.

The outlines of the chief phenomena of typho-malarial fever which I have thus endeavored to present to you to-day are necessarily incomplete, for it is, of course, impossible to go into the details of so large a subject in an address like this. I hope to be able to fill up these outlines in a satisfactory manner in the second volume of the Medical History of the War.

And this brings me, at length, to answer the question—Is typho-malarial fever a special type of fever?—and I reply, unhesitatingly, that it is not. I, at least, am free from the blame of that error, if any one has fallen into it. In my first published account of typho-malarial fever, I expressly denied that it could be regarded as a new disease. "Much rather," I said, "should it be considered simply as a new hybrid of old and well-known pathological conditions, in which the exact train of symptoms is as variable as the degree of preponderance attained by each of the several concurring elements."* And this is the view which I advocate to-day. The essential point which I desire most to impress upon you is the recognition of the group of hybrids between typhoid fever and the malarial fevers. The scorbutic complication was a mere accident of the war: its existence is by no means essential to the idea of typho-malarial fever, but in dealing with the typho-malarial fever of the war I could not omit it from the picture.

It was, and still is, my belief that the mixed forms of fever which I have thus sketched constituted the great majority of the continued fevers of our army during the civil war. I still, however, adhere to the

* *Op. cit.*, p. 111.

opinion which I expressed in Circular No. 15 of 1863, and in Circular No. 6 of 1865, that simple typhoid fever and simple remittent fever did also occur, though the statistics fail to show to what extent; and I still adhere, also, to the view then expressed, that a large portion of the cases actually reported during the war "as typhoid and remittent fevers are, to a great extent, to be regarded simply as those in which the typhoid or the paroxysmal phenomena predominated."

It would follow, from the views I have advanced, that typho-malarial fever ought to be encountered also in civil life, particularly in our Southern States; not, indeed, to the same extent that it existed during the war, when hundreds of thousands of soldiers, born and bred in the Northern States, campaigned in the malarial valleys of the South, but to an extent which deserves thoughtful recognition. And this, I must believe, from my own observations, and from facts communicated by professional friends in various parts of the South, is actually the case.

Since the close of the civil war my doctrine of typho-malarial fever has been accepted with approval in many quarters, and the term has been extensively used. Dr. Meredith Clymer* has adopted it as a synonym of "American Camp fever" in his edition of Aitken's Science and Practice of Medicine. Dr. George B. Wood,† though unwilling to adopt the name, has fully recognized the great prevalence during the civil war of "this mixture of the two fevers." In the sixth edition of his work on Practice of Medicine, published in 1866, he remarks: "Since the last edition was published this complex affection has been much more prevalent than before, probably because great numbers of young men engaged in the armies at an age when the predisposition to enteric fever is strongest, have been in an unusual degree exposed to the joint action of the causes of the two fevers; to that of enteric fever, in the almost unavoidable filth attendant upon great encampments, and to that of bilious remittent or intermittent in the low grounds from which miasmatic effluvia are so abundantly extracted in our Middle and Southern States in the latter part of summer and in autumn."

Dr. Austin Flint,‡ whose former experience in the South makes me regard his opinion in this matter as particularly valuable, in his Treatise on the Practice of Medicine, has adopted the term typho-malarial fever as a convenient designation to represent the hybrids which had been indicated by Drake and Dickson, and which Flint himself tells us he

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* Wm. Aitken. *The Science and Practice of Medicine, with additions by* Meredith Clymer. Philadelphia, 1872, Vol. 1, p. 607.

† *Op. cit.*, Vol. I, p. 377.

‡ Austin Flint. *A Treatise on the Principles and Practice of Medicine.* Philadelphia, 1866, p. 749; also, Fourth Edit. Philadelphia, 1873, p. 934.

has recognized in his own lectures to medical classes for twenty-five years. His article on simple remittent and typho-malarial fever is an admirable one, to which I refer you with pleasure.

With this intelligent corroboration and support of my views on typho-malarial fever, there has been, I must admit, some indiscriminate use of the term, which is well calculated to bring it into discredit. I have myself known it to be erroneously applied to simple typhoid fevers, in the clinical history of which I at least could see nothing to indicate a malarial complication, and to simple remittents in which I could perceive no typhoid symptoms. I think I have observed, also, a tendency in certain quarters to bestow the term upon almost any obscure febrile affection which offered diagnostic difficulty. May I not hope that the dissemination of this address may serve to diminish abuses of this kind hereafter?

But although widely accepted, my views with regard to typho-malarial fever have not escaped criticism. Dr. Roberts Bartholow,* formerly an Assistant Surgeon of the Army, and now a successful practitioner in Cincinnati, has attacked them with a good deal of acrimony in an article on the Camp Fevers of the Civil War, which he contributed to the Medical Volume of the Memoirs of the United States Sanitary Commission. Led away by the energy of his attack, he goes so far as to affirm boldly "a *typh* element did not in my experience exhibit itself as a modifying condition in remittent fever." He declares the camp fevers of the army to have been remittent, simple continued, typhoid, and typhus, and affirms that "these several forms of fever preserved as distinct clinical features in the army as the same forms of disease in civil life." To give force to his criticism, he even goes to the extent of misrepresenting my views, and says: "There were, therefore, according to Woodward, really no cases wholly typhoid, or wholly remittent, in the army"—although I had distinctly affirmed the occurrence of such cases in all my publications on the subject. I will not pause in this place to answer these criticisms of Dr. Bartholow in detail. I would merely remark that, although he makes typhus one of the forms of camp fever, he himself admits that he has no knowledge of it from personal observation. And though he is so ready to deny that the *typh* element, as he calls it, can complicate malarial fevers, he is compelled to concede that the malarial influence can complicate typhoid fever. This he has explicitly affirmed to be a common occurrence in civil life, in another article contributed to the same volume of the Memoirs of the Sanitary Commission. His language is: "I have already

* Roberts Bartholow. *Camp Fevers*, being chap. 2 of the *Medical Volume* of the *Memoirs of the U. S. Sanitary Commission*. New York, 1867, p. 193, *et seq.*

adverted to the fact that, as populations increase in malarious districts, typhoid supplants the intermittent and remittent fevers. During the transition period a mixed fever prevails; it is a typhoid fever with a malarial complication."* He admits, therefore, the combination of malarial and typhoid fevers, but holds that the typhoid element is always dominant. Against this, I maintain that sometimes the one and sometimes the other of the two elements predominates, and I must believe that the facts are on my side. I may add that the distinguished editor of the volume of Memoirs in question, Dr. Austin Flint, felt himself called upon to append to Dr. Bartholow's essay the following remark: "The general favor with which the term typho-malarial has been received, and the readiness with which it has come into vogue, show that it expresses a pathological doctrine consistent with clinical experience."†

In his hasty criticism, Bartholow falls into another error—so mischievous, that I cannot permit it to go unchallenged. He denies the frequency of a scorbutic taint among our soldiers during the civil war, and thinks that even the cases reported as actual scurvy include many of "ordinary stomatitis." He says: "In a pretty extended course of observation, I did not meet during the war a single well-marked case of scorbutus."‡ A general belief that Bartholow's opinions as to this matter are correct would be a serious obstacle to any attempt to improve the alimentation of our soldiers in any future war. In fact, however, this opinion is so far wide of the truth, that I can only understand it as an illustration of the extent to which one may be led astray by the eagerness of controversy. It is not necessary to leave the volume in which Bartholow's paper is printed to find evidence to contradict him. You will find such evidence in the paper by Dr. Sanford B. Hunt,§ which constitutes the third chapter of the volume; and in the first chapter of the volume, by Dr. Bartholow himself,‖ he makes a series of statements which fully justify my views. Thus, he affirms that the amount of aliment furnished to the various armies was too often "determined by the transportation available for bringing it forward, and by the so-called military necessity;" and that "the armies operating in the interior region were more affected by deficiencies in commissariat supplies than those on the Atlantic coast," of which fact he gives several striking examples. He explicitly states that "the diet was not sufficiently varied." "Anti-scorbutics came to be furnished after the first year of the war, but the chief antiscorbutic—the potato—was practically unavailable, from the difficulty of transporting and preserving it."

Is it wonderful that, in this connection, Dr. Bartholow, adopting the

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* *Op. cit.*, p. 126. † *Op. cit.*, p. 214. ‡ *Op. cit.*, p. 196. § *Op. cit.*, p. 64. ‖ *Op. cit.*, pp. 16–19.

very term he criticises when used by me, should have felt compelled to write: "A scorbutic taint was to be observed in troops who had served in the South for a considerable period;" and, further on, that "an impoverished state of the blood, due to defective alimentation, undoubtedly existed to a large extent. It exhibited itself in various forms, but especially in increasing the fatality of diseases and in impressing an adynamic character on those of mild and tractable forms." Still further: "The camp fever of the army was essentially typhoid. It was modified by various accidental and specific causes. We have just alluded to one of the specific modifying causes—malaria. The most important of the others was scorbutus."

It would occupy too much time for me to attempt to bring forward even a small part of the evidence on which my belief of the wide-spread existence of a scorbutic taint among our troops during the late war rests. My own observations and opinions have been corroborated by those of numerous capable medical officers. As for actual pronounced scurvy, so fully developed that it could be recognized by the average regimental surgeon, 30,714 such cases, not of the scorbutic taint, but of "SCURVY," were officially reported among the white troops during the war, and 16,217 among the colored troops.*

The other critic to whom I desire to refer is Dr. Jerome Cochran of Mobile, whose objections I find in the Transactions of the Medical Association of the State of Alabama for 1875.† This gentleman's service as a Surgeon in the Confederate Army inclines me to regard his somewhat grotesquely presented criticism with a respect I could not have felt had it proceeded from a less reputable source. Singularly enough his objections precisely contradict the objections of Bartholow; so that I might readily call upon either gentleman as a useful witness to contradict the asseverations of the other. Bartholow will see nothing in the continued fevers of the war but the typhoid element; Cochran will see nothing in the fevers around Mobile but the malarial element.

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*The ratio of these cases to strength greatly increased during the latter part of the war, and attained formidable proportions among the troops sent to Texas during the year following the war. The following ratios are computed from the tables published in the first volume of the Medical History of the War:

*Ratio of Cases of Scurvy per 1,000 of mean strength.*

WHITE TROOPS.

| | |
|---|---|
| Year ending June 30, 1862 | 4.7 |
| " " " " 1863 | 12.6 |
| " " " " 1864 | 9.6 |
| " " " " 1865 | 22.4 |
| " " " " 1866 | 28.4 |

COLORED TROOPS.

| | |
|---|---|
| Year ending June 30, 1864 | 66.5 |
| " " " " 1865 | 65.0 |
| " " " " 1866 | 141.6 |

†JEROME COCHRAN. *Note B. Typho-malarial Fever.* Trans. of the Med. Association of the State of Alabama, 28th Session, 1875. Montgomery, Ala., 1875, p. 337.

"During the last six months," he writes, "several cases of protracted fever, primarily of malarial origin, but assuming in their course certain typhoid symptoms, have been related to the Society under the name of typho-malarial fever." He objects to this term and the theory which it implies. He thinks the fevers in question are purely malarial. "The malarial mother is easily found, the fruitful mother of many children, but for the typhoid father I have looked in vain through all the streets and alleys, in all the wards and suburbs of the city;" and again: "I can only continue to say that if we have typhoid fever here, I have never seen it."

Now, the very same volume in which Dr. Cochran publishes this, contains a tabular statement of the deaths in Mobile during the year 1874. Among these I find 3 from intermittent fever, 12 from remittent fever, 7 from congestive fever, 1 from typho-malarial fever, 6 from yellow fever, 1 from hæmorrhagic-malarial fever, and 5 from typhoid fever.* Dr. Cochran himself tells us in the course of his remarks that his antagonists among the Mobile physicians declare the existence in that town of "a continued fever with diarrhœa, dry tongue, frequent delirium, a rose rash, running a persistent course of three weeks or more, and defying all treatment to arrest its progress;" but he will not admit that this fever is typhoid. He does not bring forward any dissections in proof of his views; indeed, he does not appear to have made a single autopsy in any of the cases in dispute. He bases his opinion entirely on *a priori* considerations deduced from his belief in the incompatibility of the idiopathic fevers. He proclaims that "there can be no doubt whatever of the truth of John Hunter's general doctrine, that no two of them can exist in the same part of the body at the same time." I can only express my belief that if Dr. Cochran had spent a part of the time which he has employed in criticizing my views, in making, with his fellow-practitioners, some autopsies on the cases of fever, which he tells us they persist in calling typho-malarial and typhoid, he would have arrived at results quite at variance with the opinions he has expressed.

And now, one word before I close, as to the question of nomenclature. Is it convenient to bestow a single term, as I have done, upon the whole brood of hybrid forms resulting from the simultaneous action of malaria and of the causes of typhoid fever; or, is it best to use several designations according as the one or the other of the two elements predominates? We might give the cases in which the typhoid element predominates the name miasmatic-typhoid fever, suggested by Levick,†

* *Op. cit.*, p. 314.

† *Op. cit. supra;* also a lecture by the same author, *Miasmatic Typhoid Fever.* Med. and Surg. Reporter, June 21, 1862, p. 283.

and call those in which the malarial element predominates typhoid-miasmatic fever. Such a double nomenclature we have already seen was suggested by Hermann Schmidt. We might go still further, and apply special names, in accordance as the malarial element showed itself, by giving to the early stages of the case an intermittent or remittent type. I do not think this is at all necessary, I think a single term which shall include all the hybrids quite sufficient; but I shall not quarrel with any one who wishes to make further subdivisions.

If we agree to represent all these hybrid forms by a single appellation, is the designation Typho-malarial the best for the purpose? Would it be an improvement to adopt the term "entero-miasmatic," suggested as a substitute by Dr. George B. Wood?"* I confess to a preference for the term I have suggested. It is easy enough to pronounce, and seems to me to express its meaning very well; but I attach far less importance to the employment of the name which I have suggested than I do to the recognition of the compound forms of fever which I intended to represent by it. The name is, after all, a mere matter of choice. But if I have rightly presented the subject, a just appreciation of the hybrid forms which I have urged on your attention to-day is a matter of grave practical importance. Not merely as a question of Military Medicine, though most important in that connection, for I take it that whenever again hereafter an army recruited in a comparatively non-malarial region shall campaign on a malarial soil these hybrid forms will appear once more in epidemic proportions; but meanwhile, I suppose, in sporadic or endemic-wise, we shall continue to have these cases to deal with in civil practice in all the miasmatic regions of our Middle and Southern States, and their right comprehension is, therefore, a question of serious moment to every American physician engaged in practice in such localities.

* *Op. cit.*, Vol. I. p. 377.

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